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ABSTRACT

A study of many jaws and teeth representing over eighty animals has revealed ages ranging from .5 years through adult. Charcteristics of the fourth pre-molars and third molars have been studied in an attempt to determine whether these animals are members of extinct Pleistocene species or varieties of more recent Bison.

INTRODUCTION

The Hudson-Meng Site (25-SX-115), located twenty-five miles northwest of Crawford, Nebraska, is the butchering area of a bison kill. For the past two seasons Dr. Larry Agenbroad and crews of students and volunteers have excavated the site. Approximately one-third of the original area has been uncovered. A relative date of 9,000 BP has been tentatively assigned to the kill.

A study of the collection of jaws and teeth from the site has revealed a herd of at least ninety-two animals, ranging in age from .5 years to 10.5 years and older.

This herd has not been identified as any particular species, but much evidence implies that these animals may represent a transition group between Pleistocene and Recent Bison species.

HERD SIZE AND AGE DISTRIBUTION

The herd size was calculated by counting the first molars of the jaws (fig. 1b). The specimen collection now contains eighty-one left M_1's and ninety-two right M_1's, indicating that the minimum number of animals butchered at the site is ninety-two.

Age distribution of this herd was determined by eruption and wear patterns, as described by George Frison and Charles Reher (Frison, 1970, pp. 46-47). Incisor wear, though much more consistent than wear on other teeth, was ignored in the Hudson-Meng study because of the general scarcity of incisors, and total lack of any association of incisors with other teeth.

Eruption patterns follow this schedule (figs. 1 a & b):

.5 year – calf has full set of deciduous pre-molars; M_1 is erupting, shows no wear

1.5 years – animals has full complement of dP's; M_1 is in use; M_2 is erupting, shows no wear

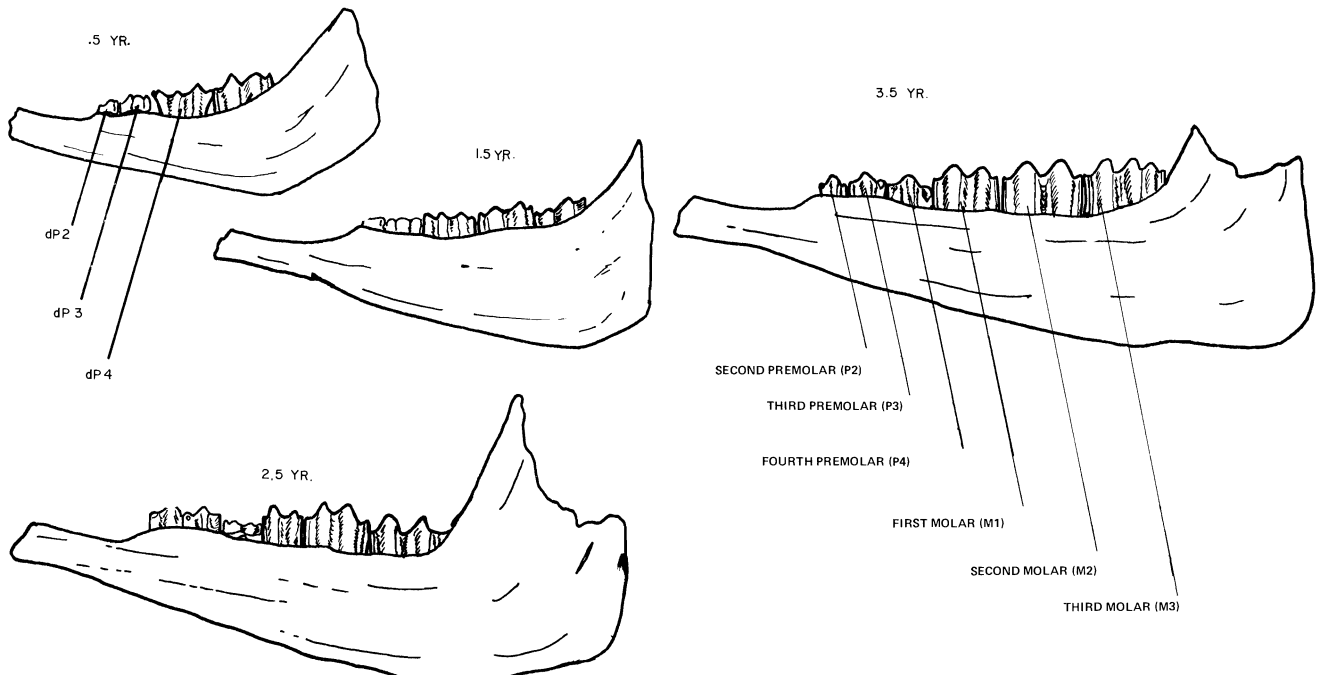

Figure 1. Right mandibles in various stages of eruption.

2.5 years – animal has lost dP_2 and dP_3; P_2 and P_3 are erupting, show no wear

3.5 years – P_2, P_3 are in use; P_4 is erupting, shows no wear; M_1, M_2, first two cusps of M_3 are in use, third cusp of M_3 is erupting, shows no wear

4.5 years – all teeth are in use; third cusp of M_3 shows only slight wear

The age of animals 5.5 years and older is determined by the amount of wear on enamel of the M_1's and M_2's.

Measurements were made of the mandibular M_1 and M_2 metaconids (lines of Fig 1b point to molar metaconids). A graph of these measurements reveal distinct peaks representing age groups in yearly increments (Fig. 2 a & b).

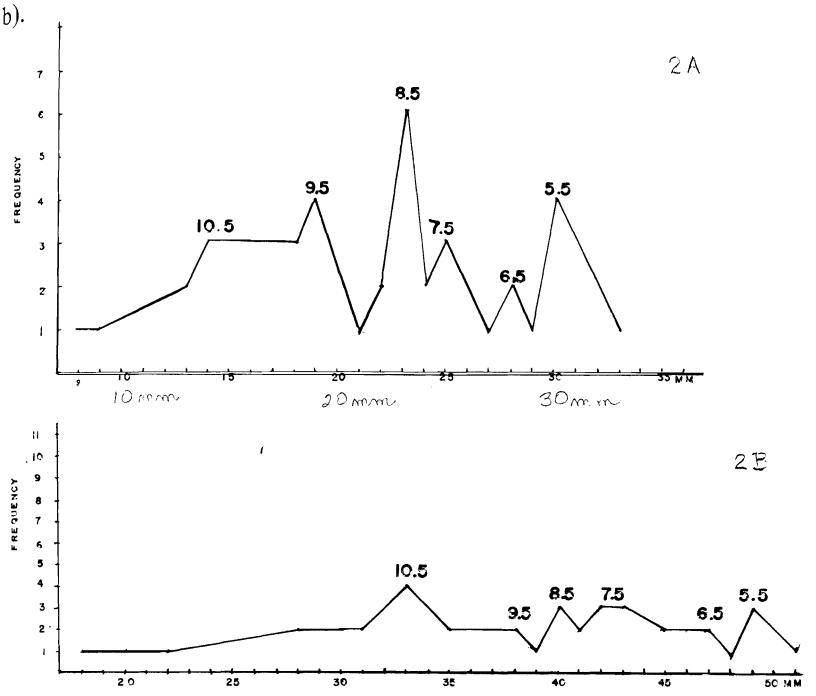

Figure 2. (2A) M_1 metaconid enamel height. (2B) M_2 metaconid enamel height

Six months after birth calves cut M_1's and subsequent tooth eruption is in yearly increments, as noted before. Assuming a spring calving season, tooth eruption occurs in the fall, so these yearly increments should also be revealed in amount of enamel wear. Following this line of reasoning, the teeth from this site would indicate a fall kill. The younger animals exhibit a uniform

pattern of eruption, and M_1 and M_2 measurements show yearly peaks.

Table 1 summarizes the age groups and distributions. The following figures represent this population spread.

TABLE 1. AGE DISTRIBUTIONS AND ENAMEL MEASUREMENTS RIGHT M_1 METACONID

Age	Group	Number Measured	Average Enamel Height	Number of M_1 in Each Group
.5 YR.	1	8	45.1mm	10
1.5	2	15	48.6	15
2.5	3	22	43.6	22
3.5	4	10	38.5	14
4.5	5	1	37.5	3
5.5	6	1	33.0	1
6.5	6	1	30.5	1
7.5	6	3	26.0	3
8.5	6	5	23.5	5
9.5	6	5	19.6	5
10.5	6	5	14.1	5
?	NO MEASUREMENTS			8
			TOTAL	92

PRESENCE OF MAXILLA AND MANDIBLES

Only one skull has been excavated, but there are many maxillary teeth in the butchering area. There are, in fact, 463 individual maxillary teeth as opposed to 644 individual mandibular teeth. Thus, of the total number of teeth, 41.5% are maxillary and 58.4% are mandibular.

Reference should be made to Hartley's (1973) description of possible use of nasal cartilage at this site and method of removing this material from the skull. Cartilage utilization might have occurred here, and could be the explanation for the presence of so many maxilla separated from the skulls.

Most of the mandibles present in the site are badly fragmented – even to the point that many are represented only by individual teeth. There are at least two documented uses of mandibles which could account for this breakage. First, mandibles served as chopping tools, the diastema being used for a handle (Frison, 1970, p. 30). Second, they provided a food source. The ventral border of mandibles was often chopped or pounded loose to get at the

marrow in the cavities around the teeth, and/or to loosen the insertion of the masseter muscle (Frison, 1970, p. 22). Possible evidence for both of these uses exist in the site material.

One hundred and eighty-four mandibular elements are represented, seventy-three of which are complete. Of these seventy-three, sixty-four are highly fragmented, suggesting impact of some type. Twenty-three mandibles are missing the ventral border, and twenty-two jaws have shattered bone and broken teeth. All this indicates forceful blows being applied to the mandibles.

The sixty-four fragmented jaws experienced impact on either the dorsal or ventral borders. The twenty-three mandibles lacking ventral borders indicate impact on that portion, either to loosen the insertions of the masseter muscle or to make access to the rich marrow around and beneath the roots of the teeth. In some cases, on the twenty-two jaws with shattered bone and broken teeth, all of the teeth are broken off. This type of breakage could imply the use of these jaws as chopping tools. The positions of the mandibular elements in the site do not suggest any centralized areas for processing or use of these elements.

SPECIES IDENTIFICATION

Data pertinent to species identification can be obtained from teeth in at least two ways: (1) by the structure of the unworn mandibular P4's; and (2) by a comparison of average enamel heights to enamel heights determined in Pleistocene Bison at other sites, and from modern Bison.

One reliable difference between Pleistocene and Recent Bison is found in the unworn fourth pre-molars (Skinner and Kaisen, 1947, pp. 139-140). The key is the relative heights of the metaconid and the protoconid (fig. 4).

A P4 protoconid higher than the opposing metaconid is characteristic of the earlier Pleistocene Bison. A protoconid lower than the metaconid is characteristic of Recent Bison. Figure 3 represents a Pleistocene P4.

The Hudson-Meng sample has nine P_4's revealing the Recent characteristic, six P_4's representing the Pleistocene character, and eleven P_4's showing metaconids which equal protoconids in height. This is unusual and could indicate an intermediate species. Measurements and comparative studies done with the metapodials from this site also indicate this possibility (Uridil, 1973).

Measurements were taken of the M_1 & M_2 (mandibular) metaconids. (Table 1) A comparative study has been done with groups 5 and 6 in two other populations of *Bison bison.* Data on those two populations are reported by Frison and Reher (Frison 1970, pp. 51-55) and Charles Reher (Reher 1973, pp. 89-101). The three groups are similar but the Wardell material, in particular, is very similar to the Hudson-Meng collection. This would seem to indicate a closer affinity of this herd to *Bison bison.*

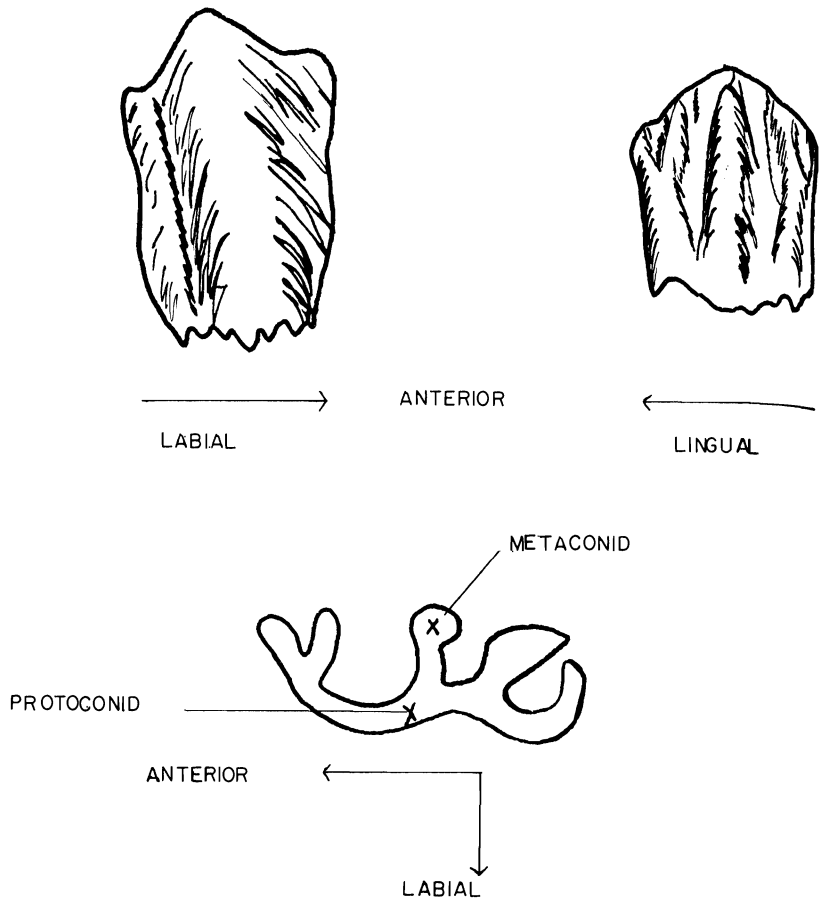

Figure 3. Fourth premolar.

SUMMARY

The Hudson-Meng Site represents a fall kill of a large healthy herd. Mandibles were probably utilized as tools and food sources, and maxilla were possibly incorporated in another food package which included nasal cartilage. At this point of investigation, the animals seem to represent an intermediate group between the extinct Pleistocene and Recent Bison.

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